Honeywell

Honeywell Solid Oxide Fuel Cells

Markets and Technology Status

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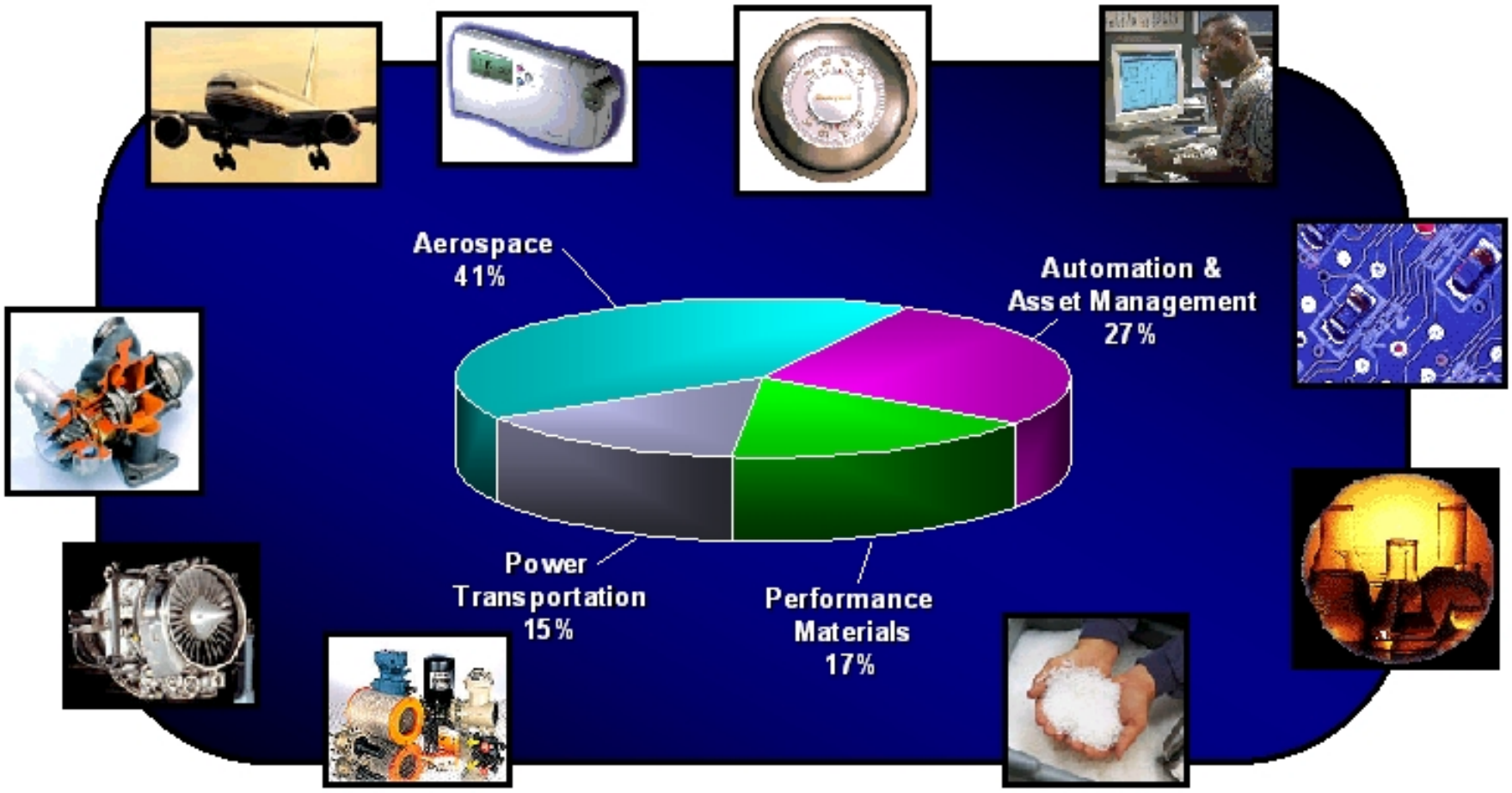
The New Honeywell: A Broader-Based Company



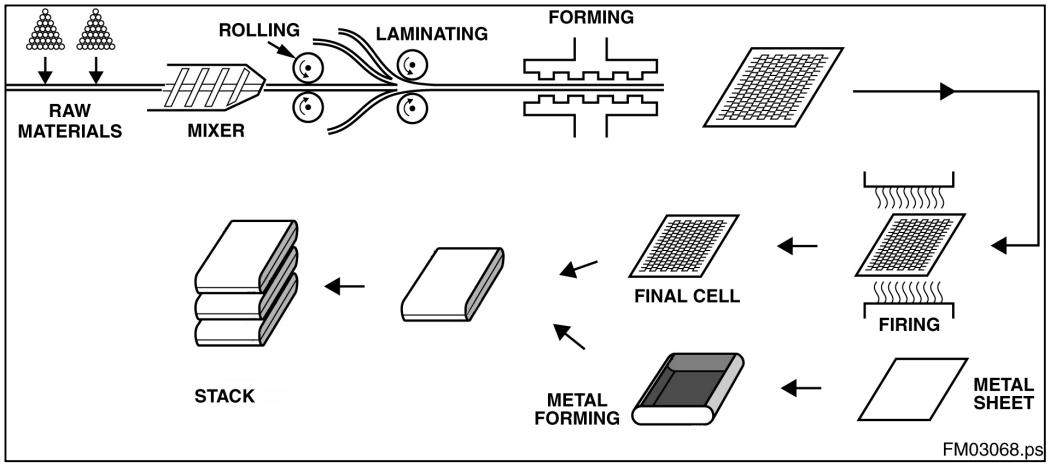
Increased diversification = increased product offerings

Approaches to SOFC Technology

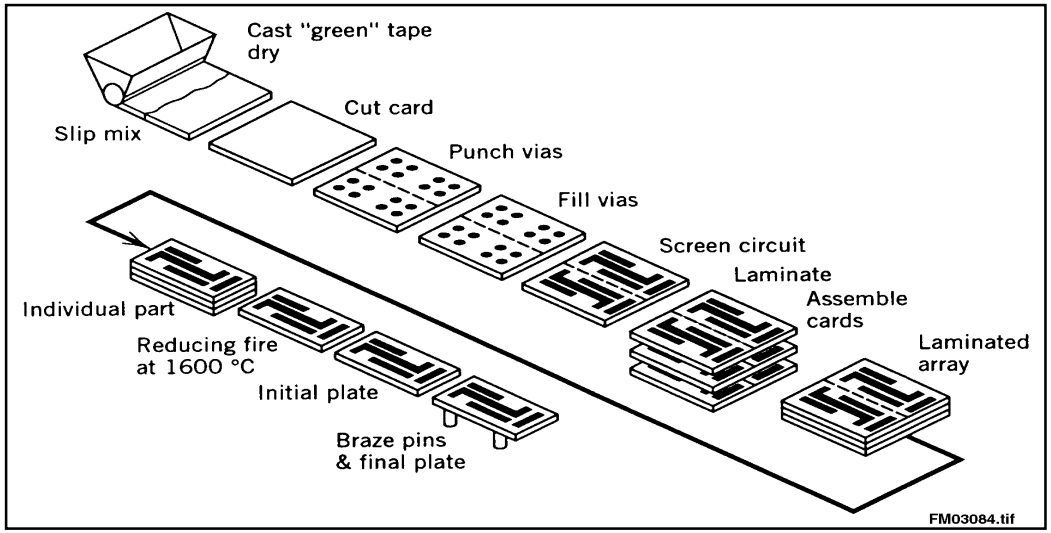
- Light weight and small size
- High performance
- Modularity
- Fuel flexibility
- Low-cost manufacturing and material

Low Cost Manufacturing Process

- **Stack fabrication process with tape calendering**



- **Multilayer electronics fabrication process**



SOFC Applications

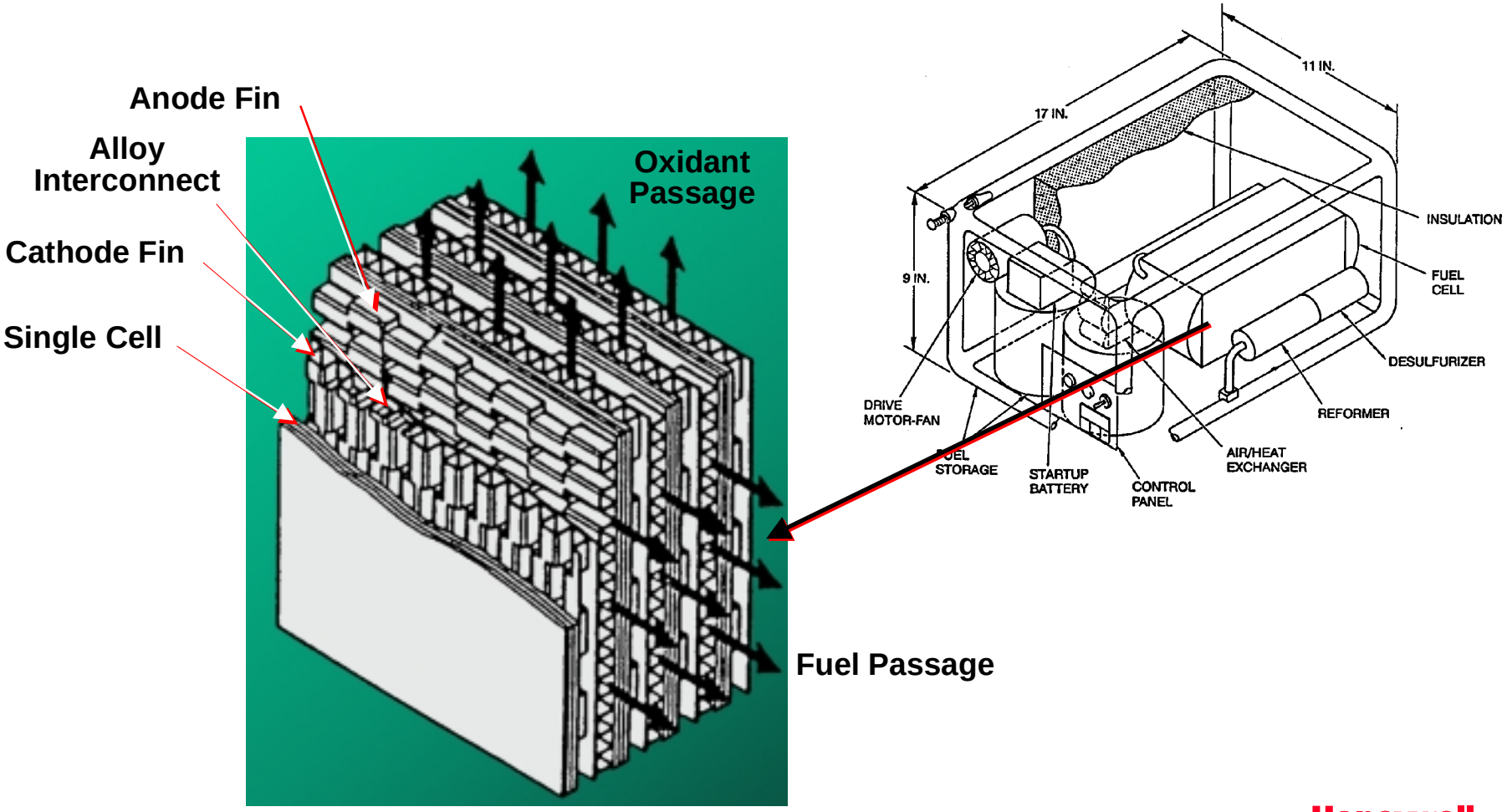
Portable
e.g. emergency, remote, recreational

Military
e.g. battery charger, APUs, motive power

Transportation
APUs

Stationary
e.g. residential, distributed, central

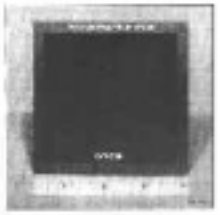
Solid Oxide Fuel Cell Battery Charger



Honeywell Portable Demonstration Unit

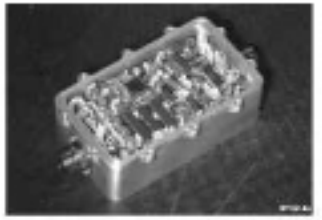
Solid Oxide Fuel Cell System Solutions

SOFC Stack



SOFC Fuel Cell

Turbo-Compressor



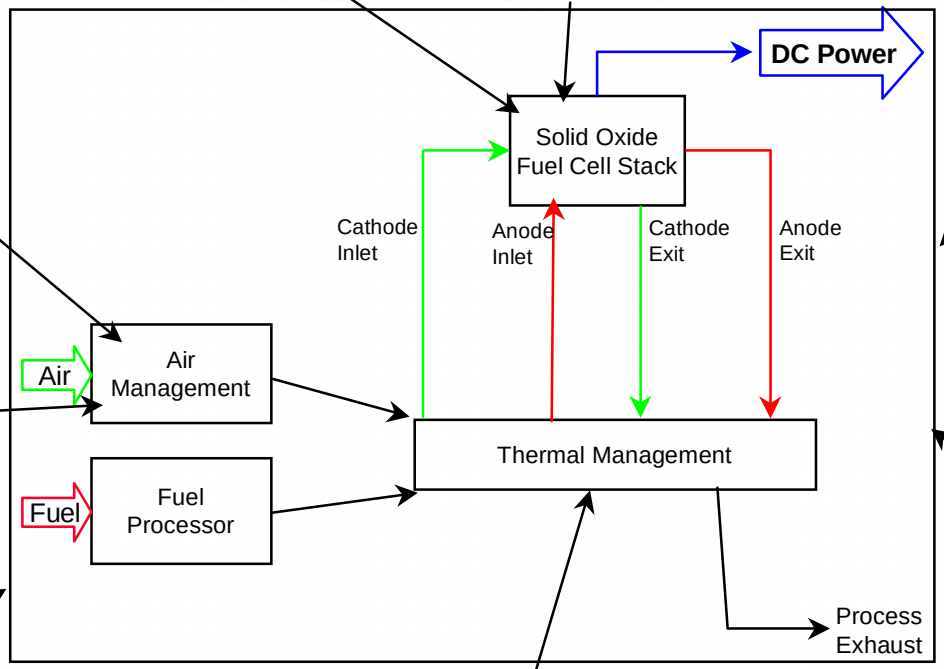
Controllers

Blowers

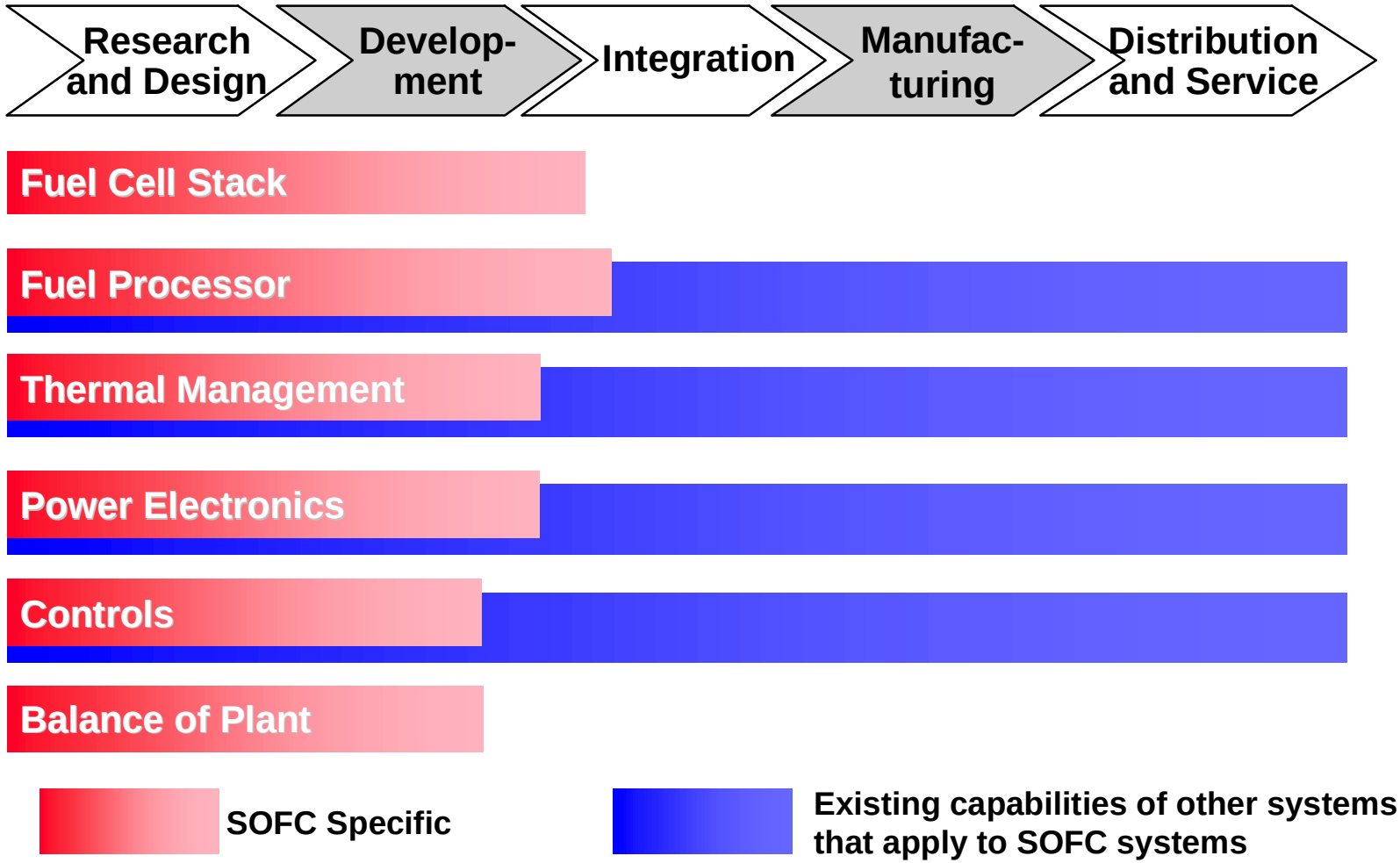
Valves

Sensors

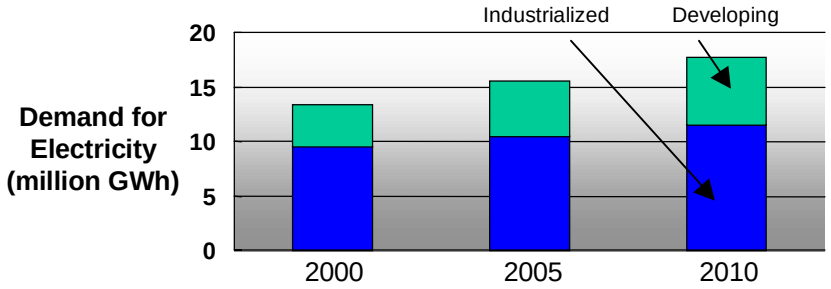
Heat Exchangers



Planar SOFC Products - Status of Development



Stationary Power Growth

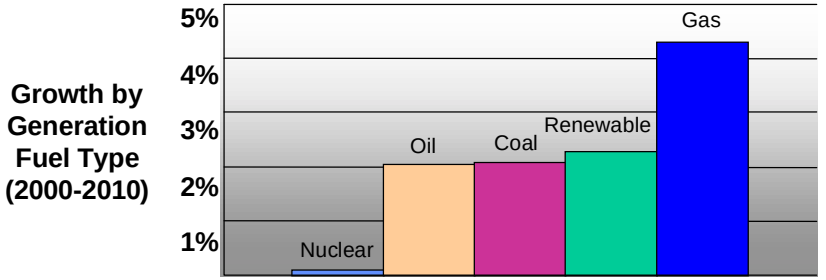


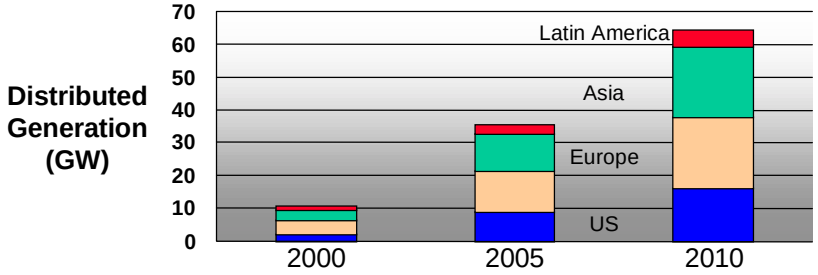
Demand for Electricity is Growing

3% CAGR

Natural Gas-Based Generation is Leading the Growth

4.3% CAGR



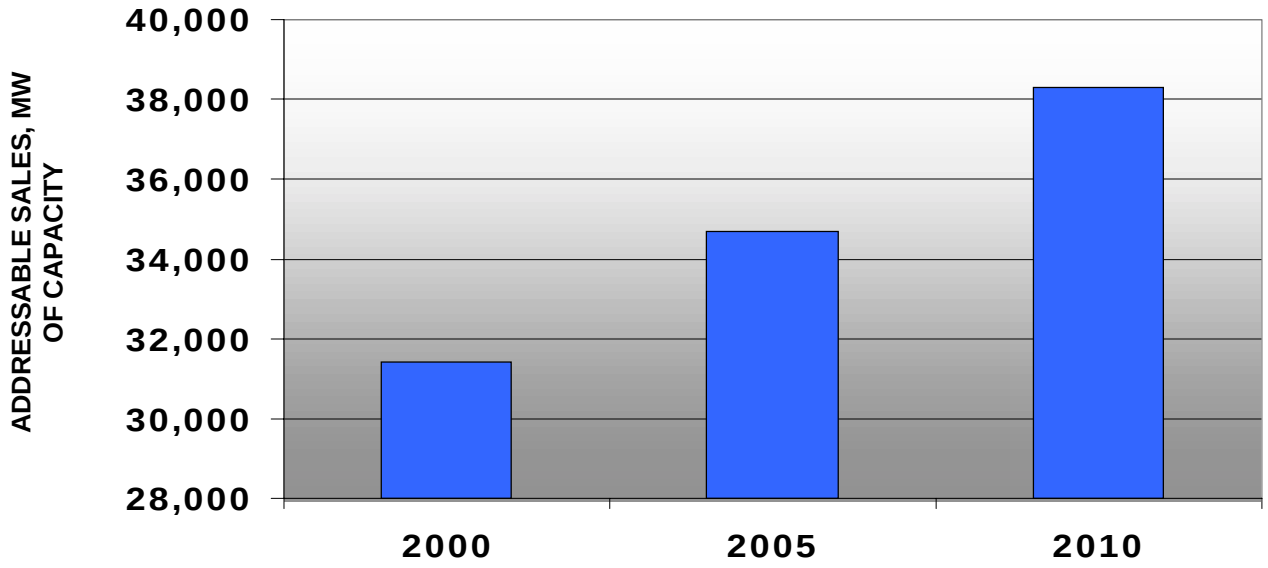


Distributed Generation is High Growth

20% CAGR

Honeywell

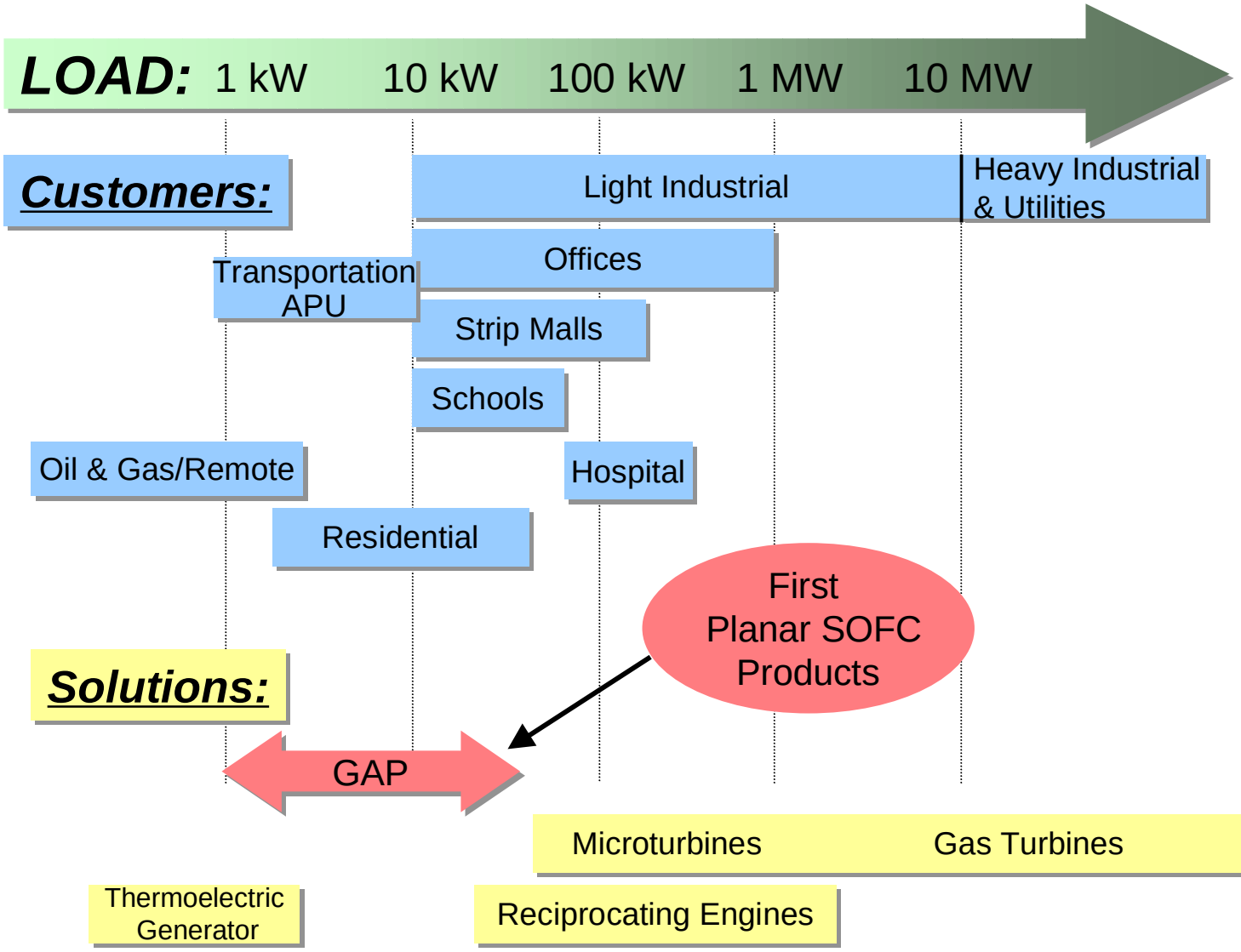
Addressable Stationary Power Market for SOFCs



DATA SOURCES

- **US Department of Energy data**
- **Arthur D. Little study**
- **Technomics study**
- **Escovale study**
- **Oberman Associates study**

Potential Entry Market



Concluding Remarks

- **Honeywell has been developing low-cost, high-performance planar SOFC technology for a broad spectrum of power generation applications**

- **Honeywell has developed business plans and technology roadmaps to commercialize SOFC products**